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THE DIAGNOSIS AND TREATMENT OF SYPHILIS AND GONORRHEA.

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1. A STATEMENT FOR HEALTH OFFICERS, PUBLIC HEALTH NURSES, AND OTHER PERSONS INTERESTED IN PUBLIC HEALTH.

The diagnosis and treatment of syphilis and gonorrhea is a medical problem, but the *control of the spread* of these diseases is a public health problem demanding the cooperation of health officers, nurses, social workers, and all other persons and agencies interested in the health of the public, as well as the physicians. In order to cooperate intelligently with the medical profession, the lay social worker must understand the principles of diagnosis and treatment of syphilis and gonorrhea.

Frequently before medical advice and treatment are sought, the social worker comes in intimate contact not only with the venereally infected person but with the family of the carrier as well. To the social worker is given the opportunity to educate the patient to seek proper treatment and to expect a continuance of treatment long after the symptoms of disease have disappeared.

The danger of transmitting syphilitic and gonorrheal infection through the marital relation, through illicit sexual intercourse, and, extragenitally, through intimate contact, is generally recognized by all who have any knowledge of venereal diseases; but the importance of early diagnosis and treatment in the eradication of syphilis and gonorrhea is not appreciated so generally. While a knowledge of the general principles of venereal-disease control is essential, the lay social worker must know the exact methods of diagnosis and treatment as well, and must make the facts known to the persons with whom he comes in contact if he is to give the most effective aid to the medical profession. With this thought in mind, the following statement has been prepared.

Syphilis.

The presence of a genital, or a suspicious extragenital, sore which refuses to heal promptly, indicates the necessity for a thorough and prolonged examination, whether the sore possesses the physical appearance of a typical chancre or not. During the first three weeks of the existence of a suspected sore the microscopical examination is the only method we have for determining accurately the presence of syphilitic infection. If any antiseptic has been applied to the suspected chancre, this examination is deferred until after the sore has been cleansed with saline solution and a saline dressing applied for at least 24 hours. The social worker must advise patients not to undertake any treatment either by systemic remedies or by medicinal applications to the sore until after a positive diagnosis has been made by finding the germ of syphilis. If the sore is free of antiseptics, serum is squeezed out, and this specimen is examined immediately with the oil immersion lens of a microscope, illuminated through a dark-field condenser. If the chancre is less than three weeks old, and if the technique has been carried out properly, the organisms causing the sore should be discovered by this method; but the discovery may require many examinations. Even though many dark-field examinations be negative, the diagnosis of syphilis should not be excluded until at least three Wassermann reactions shall have been negative.

Soon after the sore appears, small glands in the vicinity become enlarged, and it is possible for the physician to obtain a pure culture of the syphilitic organism, if it is present, by drawing into a small syringe a few drops of the serum from one of these swollen glands. This is not a very painful procedure and is particularly useful when the diagnosis has been made more difficult by treatment of the sore with caustics or strong germicides.

In those sections of the country where physicians do not have access to a microscope illuminated with a dark-field condenser, the patient is sent to one of the many laboratories or clinics where this microscopical examination is made.

The organisms causing syphilis tend to disappear from the sore after the third week of its existence, and the microscopical examination becomes less satisfactory; but, if the infection is syphilitic, the Wassermann reaction becomes weakly positive during the third week; after that time it usually gives a strong positive reaction. The blood of a person infected with syphilis reacts to certain substances differently from the manner in which the blood of a normal individual reacts; the test for this reaction is called the Wassermann test, and the degree of reaction is indicated by the terms *plus one*, *plus two*, *plus three*, or *plus four*. *Plus four* may be considered as the minimum strength of reaction which, when obtained repeatedly, is considered diagnostic of syphilis in the absence of other signs. On account of practical difficulties, reactions stronger than *plus four* are reported by the same sign, even though they be many times this strength. Lesser degrees of reaction are considered doubtful and have little value when there is no other evidence of syphilis. A single negative is evidence but not proof of the absence of the disease. A series of negative reactions continued over a period of years, unaccompanied by positive clinical symptoms of the disease, is commonly accepted as proof that the disease has been cured or that it did not exist.

The blood Wassermann reaction may remain strongly positive throughout the entire course of the disease, or during the latent and final stages the blood may give only a weakly positive or even negative reaction. In suspected syphilis, when the blood Wassermann gives only a weakly positive or negative reaction, the diagnosis may be confirmed by a Wassermann test of the spinal fluid, for the spinal fluid frequently remains positive long after the blood is negative. Because the spinal fluid may remain positive after the blood is negative, the patient whose treatment has been completed and who is being tested for cure, should not be discharged until a negative spinal Wassermann reaction has been obtained.

Throughout the various stages of the disease, patients infected with syphilis show characteristic symptoms, and, although the disease can be diagnosed only by a trained physician, the more common of these symptoms should be recognized by the health nurse or social worker. After the organisms have disappeared from the chancre and the blood Wassermann has become positive, a rash usually appears upon the body, the spots turning from a pink to a characteristic copper color. The rash is a result of the presence of a generalized infection which may be the cause of headache, fever, and depression as well. Although only an experienced physician can differentiate between a syphilitic rash and that caused by many other infections or agents, there is one manifestation of the disease which usually coexists with the rash which the health nurse and particularly the dentist should learn to recognize. During the secondary stage of the disease, ulcers usually appear on the lips or in the mouth or throat. These "mucous patches" frequently present a flat, raised surface, grayish or translucent in color, surrounded by a narrow and inflamed border. Since the syphilitic organisms abound in these patches and are liberated from them in sufficient numbers to make the saliva highly infectious, it is obvious that the person in this condition should be warned of his infectiousness, urged to seek medical diagnosis and treatment, and cautioned to guard against transmitting the infection until rendered noninfectious by proper antisyphilitic treatment. These lesions are practically painless, remain in the mouth for considerable periods, and have a characteristic appearance; therefore the school nurse, the general nurse, and the dentist, who make frequent examinations of the mouth, should discover many of these cases which otherwise would be missed.

If the disease follows the typical course, the secondary symptoms disappear and apparently the organisms become very much reduced in number. The disease then enters upon a latent stage, of variable duration, during which the patient may present no symptoms of the disease and appear to be in good health. The late manifestations of syphilis are generally recognized by those interested in public health and by the educated public as well. During the latent stage, the disease reappears most frequently as a gumma, or as a nervous derangement; but the variations in the character of late syphilis are so great that they can not be discussed here. The gumma is a tumor-like growth which replaces normal tissue, breaks down, decays, and, if it disappears, is replaced by scar tissues. The gumma may attack the skin and bones, with consequent disfigurements, or it may attack the circulatory system or any of the vital organs. If death occurs it results usually through the failure of the affected organ to function. The disease may manifest itself by paralysis of the brain, the spinal cord, or the sensory nerves, resulting in paresis (general paralysis of the insane), locomotor ataxia, atrophy of the optic nerve, etc.

When cases of syphilis in the late stages, or children with hereditary syphilis are discovered, the health nurse or social worker may be of the greatest assistance in the campaign to control syphilis by urging the families of such cases and persons with whom the patients have come in intimate contact to undergo a medical examination. Because cases of late syphilis usually are considered to be only slightly infectious, if at all, the fact is forgotten that they must have passed through one or more infectious stages to reach the condition in which they are found and that during this infectious period they probably have transmitted the disease to persons with whom they have come in contact.

TREATMENT OF SYPHILIS.

The treatment of syphilis always includes both arsphenamine or neoarsphenamine and mercury; the iodides are of value particularly in the later stages, but many physicians are now using them early in the course of the disease. As soon as the disease has been diagnosed definitely as syphilis, but never before this time, vigorous treatment should be begun. Except under unusual conditions, the initial treatment includes at least 16 doses of arsphenamine and a proportionate number of mercury injections or inunctions. The frequency of administration, the amount of drugs to be used, and the number of courses needed to cure can be determined only by the physician administering the treatment, because the treatment varies with the condition of the patient and the stage of the disease.

It is essential that social workers warn patients with whom they come in contact to abstain from drinking alcoholic beverages immediately before or after treatment with arsphenamine. Patients should be taught to appear for arsphenamine injections with an emptv stomach and not to eat again for at least three hours after the injection. When patients follow these rules one of the frequent causes of reactions from this drug is removed.

The person who is suspected of being infected with syphilis should be warned that the early stages are the most infectious and that the danger of infection is very great until at least two weeks of vigorous treatment has been administered. The patient should be warned that during its early stages the disease may be spread not only through sexual intercourse but also through contact with the secretions from the mouth and skin. As long as the suspicion lasts, or until the physician advises that sufficient treatment has been given to render that disease practically noninfectious, the patient should refrain from kissing other persons, from coming into intimate contact with them, and from using toilet articles, eating utensils, or the like, which are used by other persons.

The successful treatment of syphilis requires a minimum of two or more thorough courses with arsphenamine and mercury, with a rest period of a month or two between these courses of treatment. After the symptoms have disappeared, it is difficult to persuade the patient that further treatment is necessary. Here the social worker who comes in intimate contact with the patient and his family can be of great assistance; for such a person must be convinced of the necessity for sufficient treatment. Syphilis is essentially a recurrent disease. If insufficient treatment is given, the number of cases are negligible in which the disease does not recur, frequently with increased virulence.

Gonorrhea.

To gain a comprehensive idea of the diagnosis and treatment of gonorrhea, it is necessary to consider the disease in both the male and the female.

DIAGNOSIS OF GONORRHEA IN THE MALE.

When an acute discharge of pus occurs in the male urethra, the inflammation is caused most frequently by the gonococcus; but since other agents occasionally produce this condition, a microscopic examination of a smear from the discharge is made in the physician's office or at a neighboring laboratory. If this smear shows the presence of the characteristic coffee-bean-shaped diplococci within the pus cells as well as outside them, the picture indicates the presence of gonococci, and treatment for gonorrhea should be begun. In the later stages of the disease, or when other organisms are present, a complicated staining method may be required. In this case the smear usually is sent either to the State hygienic laboratory or to any local laboratory which is equipped for this more involved staining method.

The social worker coming in contact with a suspected case of gonorrhea should instruct the patient to appear at his doctor's office or at a free clinic, retaining his urine in order that the physician may have him pass it into two glasses; for by this test the seat of the infection usually can be determined. If the urine in the first glass is cloudy with pus and that in the second glass is clear, the infection is located in the forepart of the urethra; but when the urine in the second glass resembles that in the first, the inflammation has reached the posterior urethra, that part located within the body. If the urine is not clouded with pus but contains shreds of cast-off cells, it indicates that the disease has passed from the acute to the chronic stage.

TREATMENT OF GONORRHEA IN THE MALE.

Usually no symptoms of gonorrheal infection appear until several days after it occurs, then for two or three days a thin mucous discharge appears from the urethra. After this time the discharge may turn to a creamy yellow pus, and the disease may reach a very painful stage. During the height of the inflammation, treatment should consist of rest in bed when possible. As soon as the tenderness begins to subside, treatment with germicidal solutions may be employed. Many agents are used, and the number and frequency of application vary with the different agents. Acriflavine, one of the dye products, when administered daily is retained in the urethra for five minutes. Argyrol or protargol, silver derivatives, or permanganate of potash may be used several times daily. Only a physician experienced in the treatment can determine the strength to be used, the frequency of application, and the length of time that the treatment should be continued; but the social worker can be of great assistance in urging the patient to continue treatment until cure is complete, in warning him against quacks and self-medication, in educating him to follow directions, and in encouraging faith in the treatment which is being administered.

Proper hygiene is as essential to the cure of gonorrhea as is proper treatment. The social worker must influence the patient to abstain from drinking alcoholic beverages, from eating highly seasoned food, from indulging in sexual intercourse, and from exposing himself to exhausting experiences. The necessity for observing the rules of hygiene is impressed upon the patient by the physician, but the social worker can give more time to this educational work than can be allotted to it in a clinic or a busy office

When improperly treated (or untreated), the disease may pass into a chronic stage in about six weeks. The successful treatment of chronic gonorrhea requires both experience and skill upon the part of the physician and the constant coöperation of the social worker.

To insure success in treatment it may be necessary for the physician to locate the source of trouble by visual inspection through a urethrascope, and to treat the disease through this instrument. The cure of chronic gonorrhea may require a year or more of treatment, which sometimes may demand the services of a skilled specialist. The social worker can be of greatest assistance to the specialist in urging such patients to persist in their efforts to obtain a cure.

In testing for cure, the examination, which is made after all treatment has been stopped for a week, should reveal no discharge from either the prostate or the urethra. The urine examined in the two glasses should be clear or should contain no pus cells or gonococci. Should any germs be found, they are examined by a skilled observer, using Gram's method of staining. An irritating injection of silver nitrate is sometimes employed, and should a discharge be obtained it must show no gonococci. The complement fixation reaction and the provocative injection of vaccines are used frequently as supplementary tests of cure.

DIAGNOSIS OF GONORRHEA IN THE FEMALE.

In the early or acute stage, gonorrhea in the female usually produces an abundant discharge of pus, in which the gonococci can be found by a microscopical examination. The acute stage is of relatively short duration, and the disease soon passes into the chronic stage, when frequently it is impossible to obtain smears which show satisfactorily the presence of gonococci. If the chronic stage is suspected, the examination is made one to three days immediately after the cessation of the menstrual flow. During the previous week no treatment is given, and the patient is instructed to appear for examination without having urinated or washed the organs within six hours prior to the examination. Under these conditions it is possible for the physician to examine the organs to discover discharges and to search the various pockets in the genital organs for inflamed areas and for pus. The diagnosis of gonorrhea in women is difficult, and the public health nurse who visits an infected woman can do much to aid the physician in preparing her for examination.

TREATMENT OF GONORRHEA IN THE FEMALE.

Success in treatment requires hospital care, and only in the very early stages is there much hope for complete cure. When the disease has passed into the chronic stage it is difficult to treat and cure is rarely accomplished except after destructive operations or the climacteric. The important field of the social worker lies in inducing infected women to seek proper hospital care, for ambulatory treatment, douching, and the like are of little value.

The treatment of acute gonorrhea includes frequent cleansing of the sex organs with mild antiseptics and the use of hot sitz baths several times daily. The surface of all these organs must be swabbed carefully with an effective germicide and cleansed with sterile water. This treatment is continued for at least a week after all discharges and local signs of inflammation have disappeared and smears fail to indicate gonococci. In the chronic stage the centers of infection have to be discovered in order to apply intensive local treatment. While major surgical interference is rarely indicated in acute complications which occur during this stage, the infection may form pus pockets in the tubes which later may necessitate an operation. Infection of both tubes is a frequent cause of sterility.

Children born of women infected with gonorrhea are always in danger of blindness from an infection of the eyes, which may be prevented by the application of a germicidal solution to the eyes at birth as required by law. The infringement of this State law by midwives or others should be noted carefully by health workers and all violations should be reported. Mothers should be instructed to observe their children's eyes and to go immediately to a physician when any inflammation appears.

II. TECHNICAL NOTES ON THE DIAGNOSIS AND TREATMENT OF SYPHILIS IN THE PRIMARY AND SECONDARY STAGES.

SUPPLEMENTING "A MANUAL OF TREATMENT OF THE VENEREAL DISEASES," REVISED BY THE UNITED STATES PUBLIC HEALTH SERVICE, FOR CIVILIAN PHYSICIANS.

The diagnosis and treatment of venereal disease is covered thoroughly in "A Manual of Treatment of the Venereal Diseases," prepared originally for the use of the Medical Department of the Army, but later revised for the use of civilian physicians. The physicians in any State in which the department of health does not supply these manuals may buy them from the United States Public Health Service for 25 cents a copy.[1]

At the recent Institute on Venereal Disease Control held in Washington, D. C., the diagnosis and treatment of syphilis and gonorrhea were discussed by recognized leaders in syphilology and urology in the United States. At this meeting, methods in the treatment of syphilis, slightly at variance with the outline indicated in the manual, were brought forward, and these should be made known to the physicians who were not present. This supplement to the manual has been prepared in order to emphasize the main factors in the diagnosis and treatment of syphilis in the primary and secondary stages, and to indicate the public facilities which are available for the assistance of the physician in diagnosing and treating this disease.

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[1] A copy of this manual was sent to each physician in New Jersey who indicated an interest in the subject, and upon request a copy will be sent by the Bureau of Venereal Disease Control, State Department of Health, Trenton, N. J., to any other physician.

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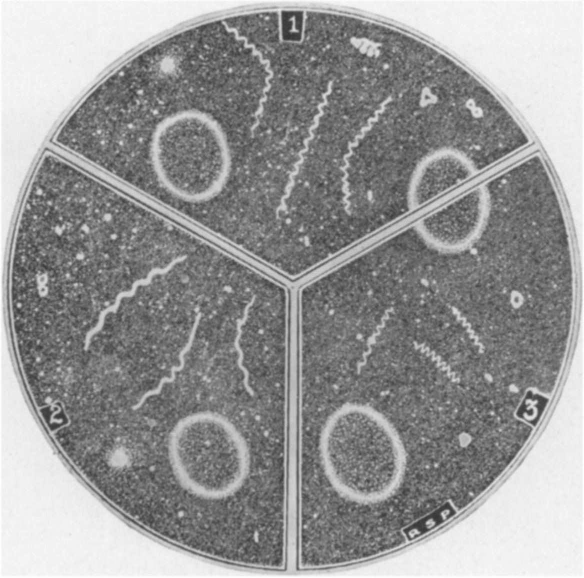

1. Treponema pallidum.
2. Spirochaeta refringens.
3. Spirochaeta dentium.

Notes on the Diagnosis of Primary Syphilis.

Early diagnosis of syphilis is important; for the earlier the treatment is begun, the better are the prospects of cure. As the Wassermann reaction usually does not become strongly positive until the fourth week after the appearance of the chancre, a clinical diagnosis can be corroborated before that time only by a microscopic examination of the serum from the lesion or adjacent lymph nodes. In diagnosing primary syphilis, the physical characteristics of the initial lesion should not be relied upon when unsupported by laboratory evidence, because the so-called pathognomonic physical appearance of a chancre is not a reliable guide. A true chancre may be so atypical that suspicion is aroused only by the location of the sore, or it may be obscured completely in a double infection.

The dark-field examination of the chancre.—When a patient appears for diagnosis with a genital lesion or other suspicious sore, the serum expressed from it should be examined with a microscope equipped with a dark-field condenser. If an antiseptic dressing has been applied to the sore, it must be removed, the lesion irrigated with physiologic sodium chloride solution, and a wet saline dressing applied for at least 24 hours before the examination is made. If the sore has not been treated with an antiseptic, or if the antiseptic has been removed as just described, the lesion should be cleansed by rubbing it with gauze wet with saline to remove surface organisms, such as *Spirochaeta refringens*. After drying, moderate squeezing will express serum from the sore, but care should be taken not to cause bleeding. A slide should be touched to this serum, and the specimen should be protected immediately with a cover glass and examined under the oil-immersion lens of a microscope illuminated through a dark-field condenser.

The *Treponema pallidum* appears as a brilliantly white spiral, in length from one to two times the diameter of a red blood corpuscle. The spiral contains from 10 to 20 close turns, which retain their shape well while the organism moves about with both a lateral and rotary motion. If a genital chancre has been cleansed properly, there will be usually no contamination by spirochaetes which might be confused with the *pallidum*. The organism most frequently confused in this examination is *Spirochaeta refringens*, which is obviously coarser than the *pallidum*, contains fewer and less regular turns, does not retain its shape when at rest, and darts about the field rapidly and erratically. The serum from primary lesions on the lips and in the mouth is usually contaminated with *Spirochaeta dentium*, which further complicates the differential diagnosis. However, *S. dentium* is much smaller than *T. pallidum*, and the curves of the spiral are much more tightly rolled. The accompanying plate indicates diagrammatically the differences in these three organisms.

T. pallidum found in lymph nodes.—The nature of oral lesions can best be determined by examining the serum obtained from the neighboring enlarged lymph nodes. Several failures to find *T. pallidum* in the serum of any suspicious lesion should lead to the examination of the lymph nodes in the drainage area of the sore. Frequently these lymph nodes will be found to be indurated. In this case the skin surface should be sterilized with 70 per cent alcohol or tincture of iodine, the node confined between the thumb and finger, and the needle of a small syringe inserted through the capsule. A slight motion of the needle will macerate the lymphatic tissue, from which a few drops of serum usually can be aspirated into the barrel of the syringe. If no serum can be withdrawn by this method, the syringe should be disconnected from the needle, which is left in the node, and about one-half cubic centimeter of *sterile* saline solution should be drawn into the barrel and injected into the node. After a slight manipulation of the tissue some of the fluid may be aspirated into the syringe. The fluid should be examined immediately by the dark-field method. If the lesion is of syphilitic origin, repeated examination by either or both of these methods generally will demonstrate the presence of *T. pallidum*.

As there are many cases of primary syphilis in which repeated examinations by the dark field are negative, repeated negative Wassermann reactions must be obtained before the patient is discharged. *Not less* than three Wassermann reactions should be made; the first preferably during the fourth week of presence of the sore, the second during the sixth week, and the third during the twelfth. Opportunities for observation and help in differential microscopical diagnosis are open to physicians at many of the venereal disease clinics which are equipped for this examination and are conducting the examinations frequently.

The period when both the dark field and the Wassermann may be of value.—After the third week of the existence of the chancre, *T. pallidum* tends to disappear from the primary lesion; during the third week the blood usually shows a weakly positive Wassermann reaction; after that time, as a rule, the reaction is strongly positive. As the organisms may be discovered in the serum from the infected lymph nodes, frequently for some weeks after they have disappeared from the primary lesion, we may have the benefit of a strongly positive Wassermann reaction as well as a positive dark-field examination in corroborating our clinical diagnosis.

THE BLOOD WASSERMANN REACTION.

During the past five years there has been a marked increase in the number of laboratories which perform the Wassermann reaction, so that to-day few physicians are so situated that they can not avail themselves of this indispensable service in the diagnosis and treatment of syphilis. State hygienic laboratories and many county, city, hospital, and private laboratories perform the Wassermann test. The State hygienic laboratories furnish outfits for taking blood specimens, and make the test without any charge. While the use of the blood Wassermann reaction as an adjunct to clinical diagnosis is increasing, there still are reported to departments of health a very large proportion of cases in which syphilis is diagnosed without any laboratory evidence.

The interpretation of the blood Wassermann reaction.—As the blood Wassermann reaction is indispensable as evidence of the presence or absence of syphilitic infection in most cases, and should be used in all cases except those of early primary syphilis, the value of the test must be appreciated and the interpretation understood by every physician if the test is to achieve the place which it deserves in the diagnosis of syphilis. By the third week of the existence of the chancre we begin to discover evidence, through the Wassermann reaction, of some chemical change taking place in the blood. As the disease progresses, the laboratory indicates the increase in the amount of chemical change in the blood by reporting the reaction as +, + +, + + +, or + + + +. Under this arbitrary standard, the number of plusses indicates roughly the varying degrees of change in the blood until the minimum amount of change is reached, which usually is considered pathognomonic of syphilis. This pathognomonic minimum amount of change is reported as plus 4. As the change increases beyond this point, no further measure of the increase is made, and so it is reported as plus 4 until, after proper treatment or the lapse of years, the evidence of chemical change disappears from the blood and it is reported as + + + +, + + +, + +, + or — (negative).

Sensitized and nonsensitized antigen.—As there are different standards in the amount of chemical change considered necessary to determine a doubtful reaction, many laboratories give an approximate evaluation of the Wassermann reaction which they perform, and this procedure should be adopted more generally. If the evaluation be not given, the type of antigen and method used should be stated; for in border-line cases a + + + + reaction frequently may be obtained, by the use of a cholesterinized antigen or "ice-box fixation," when only a weakly positive or negative result is obtained by the use of a less sensitive antigen such as alcoholic extract of syphilitic liver or plain beef heart, or by the use of higher temperatures for fixation.

Thus, strongly positive results with the less sensitive antigens are practically diagnostic of syphilis, but negative results with these antigens are frequently obtained in the latent stage of syphilis, and hence may be misleading. Therefore, patients in this stage should have the benefit of the reactions with the more sensitive antigen, which would show the presence of a very slight chemical change which, if missed might be the forerunner of a recurrence of syphilis. Theoretically, while weakly positive reactions with the less sensitive antigens would seem equal to strongly positive reactions with the cholesterinized antigens, they are not of equal diagnostic value, because, in practice, it has been found that weakly positive reactions are unreliable with all types of antigens.

The "ice-box fixation" method.—The sensitivity of the Wassermann reaction is increased not only by the type of antigen used but further by the time and temperature used for the first stage of the test. Many of our progressive laboratories have adopted the "ice-box fixation" method, in which the first half of the test is performed at a low temperature for about four hours. This method increases the sensitivity of all antigens without an apparent relative increase in the number of false positives obtained. In a treated case the test for cure should include a Wassermann reaction made by this method.

As different standards exist, the same serum may be reported upon differently by different laboratories. This dissimilarity is used by some physicians to condemn the laboratory which appears to be at fault; but usually it is evidence merely of the use of different methods.

The judicious physician, instead of pitting one laboratory against another, will familiarize himself with the standards and procedure of one good laboratory, will assure himself of the proper interpretation of the reports, and generally will rely upon that one laboratory for diagnostic assistance. It is obvious that all specimens of a series of reactions used in determining the effect of treatment upon the blood of a patient should be performed by the same laboratory; for by this means only can analogous results be assured.

SUMMARY.

1. The results of the roughly quantitative test of the amount of chemical change in the blood serum caused by syphilitic infection are reported as –, +, + +, + + +, or + + + +.

2. When the change has reached a minimum considered as pathognomonic of syphilis, it is reported as plus 4. The sera of two cases, one primary and the other secondary, may both be reported as plus four, although the serum of the former may have just passed the

stage during which it would have been reported as plus three, while on the other hand the serum of the latter may have reached a stage where logically it might be reported as 16 times plus 4.

3. Interpretation of sensitive blood Wasserman reactions in:

Thoroughly treated cases.[1]		Untreated cases.	
−	indicates probable cure, if continually negative for two years (suggested intervals 1-2-3-4-5-6 months. The last blood should be corroborated by the spinal fluid, especially when there is a likelihood of neurosyphilis).	−	practically excludes syphilis, except— (*a*) In primary syphilis (a negative is rare after the third week of the primary lesion); (*b*) In some cases of latent syphilis (a negative is rare before the third year); and (*c*) In many cases of neurosyphilis (as the blood Wasserman may be negative, the spinal fluid must be examined also).
+ ++ or +++	indicates the necessity for further treatment, but shows an approach toward cure.	+	should be interpreted as a negative in the absence of other evidence.
		++	in the absence of other evidence, should be repeated many times and then should be accepted as good evidence of syphilis in only the very early or very late stages of syphilis.
		+++	has more weight than ++, but should be interpreted in a similar manner. (+, ++, or +++ are common in third week of primary lesion, but should be corroborated by dark field).
++++	corroborates previous diagnosis and indicates the necessity for much more treatment.	++++	constant finding in secondary syphilis; usual finding by fourth week of primary lesion; usual finding in latent syphilis. (In absence of other evidence, should not be relied upon unless repeated.)

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[1] The Wassermann reaction should not be used as a guide *during* treatment, and a negative Wassermann should be disregarded in a case of syphilis known to be insufficiently treated.

Notes on the Treatment of Syphilis.

Treat the patient as well as the disease.—In stressing the importance of both arsphenamine and mercury in the chemo-therapeutic attack on the *Treponema pallidum* and the pathological formations caused by it, too frequently the physical condition of the patient and the toxic effects of the drugs upon him are forgotten. Proper hygienic treatment of the patient is necessary to stimulate his resistance and to assist the action of the drugs. The preliminary examination of the patient should include a study of all his organs and their functions so that proper hygiene can be advised and tonics administered when necessary; and throughout the treatment urinalyses and other examinations should be employed regularly to prevent any serious toxic effects from the drugs.

THE METHOD OF ADMINISTRATION OF ARSPHENAMINE, MERCURY, AND IODIDES.

ARSPHENAMINE AND NEOARSPHENAMINE COMPARED.

While there are few clinical data for the comparison of the relative merits of arsphenamine and neoarsphenamine, many of the recognized leaders in syphilology insist that arsphenamine should be used wherever the facilities for its administration exist, because they find that the administration of neoarsphenamine may result in dangerous reactions. The statement that 9 decigrams of neoarsphenamine are the therapeutic equivalent of 6 decigrams of arsphenamine is doubted by many syphilologists; and at least one manufacturer of the two drugs advises the administration of neoarsphenamine in double the dosage used for arsphenamine.

I. ARSPHENAMINE.

The preparation of arsphenamine solution and its injection.—Before preparing arsphenamine solutions the sheet of instructions accompanying each ampul should be read carefully in its entirety, because of the variation in different products. However, there are certain precautions which must be observed regardless of the product used.

(*a*) *The gravity apparatus and its sterilization.*—While there are many types of apparatus used for the injection of arsphenamine, the Luer-Kaufman is one of the simplest and most inexpensive. The one essential part is a special form of 2 cubic centimeter all-glass syringe, which acts merely as a valve between a Luer needle and the rubber tubing which is attached to the arsphenamine container. The entire apparatus must be boiled for about 15 minutes before using, and then rinsed with sterile distilled water. If the apparatus is not rinsed, there is danger that the concentration of the salts in the water in which the apparatus is boiled may leave a deposit of salt, which, by its contact with the arsphenamine solution, may produce reactions. When new rubber tubing is used, it must be boiled for about half an hour and the rubber stretched during the boiling process to eliminate the sulphur. Of course, the rinsing of new tubing should be thorough. The ampul containing the arsphenamine should be soaked for a few minutes in alcohol to insure sterility and to test for minute cracks in the glass.

(*b*) *Each decigram of arsphenamine dissolved in 30 cubic centimeters of water.*—Arsphenamine should be diluted with not less than 30 cubic centimeters of sterile, freshly distilled water for each decigram of the product; the temperature of the water to be used is stated by the manufacturer. While the arsphenamine should dissolve readily in this amount of water, the container may be rocked to hasten the solution; but agitation should be avoided.

(*c*) *The hyperalkalinization of arsphenamine.*—Arsphenamine gives an acid reaction to its solution and is very toxic in this form, so that it must be hyperalkalinized before injection. The inconvenience of titration has caused many physicians to give up the use of arsphenamine or to substitute neoarsphenamine, but the titration may be performed more satisfactorily when normal NaOH (approximately 4 per cent) solution is used (instead of the more concentrated solution formerly recommended) and measured from a burette or pipette. A sufficient quantity is added to the acid arsphenamine solution to redissolve the precipitate first formed; then to this neutral solution one-fifth of the amount already used for neutralization should be added to insure hyperalkalinization.

(*d*) *The injection of arsphenamine.*—The hyperalkalinized arsphenamine solution should be filtered through sterile gauze into the container, and if clear, the solution is ready for injection. The patient should lie on the table with the arm, neck, and side of chest exposed. Rubber tubing or an Esmerch bandage tightened about the upper arm will usually distend the veins sufficiently to make veni-puncture easy, but, if necessary, the opening and closing of the hand will aid in distending the veins. The site of the injection should be sterilized with 70 per cent alcohol; the skin should be drawn down and held down with the left hand while the needle is inserted into the vein with the knuckles of the right hand pressed firmly against the skin of the arm.

(*e*) *The needle point.*—Platinum needles are preferable to steel needles because they do not rust or corrode. The needle, which should be not larger than 22 gauge, should be sharp, for a dull point causes pain and tears the wall of the vein. Stokes [2] points out that if the point of the needle is too long, the needle may enter the vein sufficiently far to allow a flow of blood, yet enough of the opening may be outside the vein wall to permit of considerable infiltration of the surrounding tissues; or the point may penetrate beyond the vein and allow leakage in the same manner, in which case there will be pain but no bulging if the infiltration is slight. A point ground too short can not be sharp enough to penetrate the vein wall easily.

(*f*) *Allow two minutes for the injection of each decigram.*—When the needle has entered the vein satisfactorily it should not be moved during the period of administration. As an additional precaution against any slipping of the needle, a small piece of adhesive plaster is sometimes used to anchor the needle or syringe to the skin. The container should be elevated only sufficiently high to force a slow injection of the arsphenamine solution. At least two minutes should be consumed in injecting each decigram of arsphenamine; if the injection is proceeding too rapidly the container should be lowered; if too slowly, it may be raised.

2. NEOARSPHENAMINE.

Neoarsphenamine does not require alkalinization after solution. The greater simplicity of this injection as compared with that of arsphenamine accounts in a large measure for the popularity of this product. The gravity method of injection for neoarsphenamine is urged by most manufacturers; but the use of a syringe in injecting the product is more common under the conditions which prevail in most free clinics, for the time and effort conserved more than balance the danger of too rapid injection if the following precautions are observed:

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[2] Technical Refinements and Methods of Intravenous Injections.

(*a*) *Sterilization of syringe.*—The syringe should be boiled in distilled water, or if tap water is used, it should then be rinsed in sterile distilled water. The ampul containing neoarsphenamine should be soaked in alcohol for a few minutes to test for minute cracks in the glass and to insure sterility.

(*b*) *Preparation and injection of neoarsphenamine.*—The neoarsphenamine is best dissolved by being sprinkled on sterile water, allowed to settle, and the cylinder or flask being turned once or twice to obtain a clear solution. The solution should be filtered through a little plug of gauze stuffed part way into the stem of a funnel or thistle tube. This filtration will remove cotton, glass, or undissolved particles of neoarsphenamine which might cause embolism. Use only a recently manufactured product, without abnormal color, odor, or insolubility, and contained in a perfect package.

(*c*) *Dilution.*—Not less than 10 (preferably 20) cubic centimeters of sterile distilled water should be used for dissolving each dose of neoarsphenamine (2 c. c. for each 0.1 gm.); greater dilutions reduce the danger of reactions; lesser dilutions may be used, but they increase the danger of reactions because of the difficulty of making a slow injection with a small quantity of fluid.

(*d*) The suggestions (*d*) and (*e*) on page 865, relating to the injection of arsphenamine, apply equally to the injection of neoarsphenamine. The tourniquet must be applied, the area sterilized, and the properly sharpened needle introduced into the vein; the blood must flow freely to assure the operator that the vein has been entered properly; then the neoarsphenamine solution should be injected slowly without undue pressure.

(*e*) *Time required for injection.*—At least two minutes should be consumed in injecting each 30 cubic centimeters of solution; the temptation to hasten the injection is so great that the operation should be timed with a watch. The use of a small caliber needle, 22-gauge, is urged to help insure slowness of injection.

SAFEGUARDS TO PREVENT REACTION.

A. The patient.—(*a*) Antisyphilitic treatment should not be begun until a thorough examination of the patient has been made; the examination should include the usual tests on all the organs of the body.

(*b*) Patients who are suffering from an acute involvement of the heart, the nervous or the sensory organs, should not receive arsphenamine medication until a period of mercury treatment has prepared the patient's system for arsphenamine.

(*c*) Patients whose livers have become involved, who are febrile, or who are suffering from urinary retention or cancer should not receive full doses of arsphenamine except after the most serious consideration. Stokes advises the treatment of the cancer first; syphilis after.

(*d*) In patients who have exhibited a hypersensitivity to arsphenamine, reactions may be prevented by giving one-fiftieth grain of atropin intravenously an hour before the injection. Atropin prevents reaction probably by stimulating adrenal activity. It is wise to have a sterile syringe always on hand with adrenaline solution to be injected intravenously should reactions occur.

(*e*) The Herxheimer reaction is caused probably by the liberation of endotoxins from the destroyed Treponemata in amounts too great to be borne by the body. Usually this reaction may be prevented by a preliminary administration of mercury, which, because of its slower action, does not cause such a rapid liberation of endotoxins.

B. The administration of the drug.—(*a*) Every precaution should be observed to insure aseptic conditions. Sterilize the ampul with alcohol; boil and rinse the instruments; follow the manufacturer's directions carefully in making the solutions; guard against infiltrations and against haste in injecting, but do not allow the solution to stand an undue length of time.

(*b*) No meal should be eaten by the patient during the six hours prior to the injection, nor for three hours afterwards; but a cup of tea or coffee with a piece of toast may be taken three hours before the injection. Cathartics should be given the night before the injection and the patient urged to drink large amounts of water.

Prophylactic use of arsphenamine.—Arsphenamine alone can not be relied upon for the cure of syphilis, but it may be used as a prophylactic for a person exposed to syphilis who reports too late to be benefited by early local treatment. Clinical records show that a limited number of persons treated with two half-doses of arsphenamine after the first day of exposure and before the primary symptoms have had time to appear have never developed symptoms of syphilis. The difficulty of obtaining positive proof of the absolute value of this procedure is apparent; but it seems to be well established by negative proof that the use of two such injections is warranted.

3. OTHER ARSENICAL COMPOUNDS.

(*a*) *Substitutes for arsphenamine are ineffective.*—There are many trivalent arsenical compounds and some preparations which are merely physical mixtures of the common arsenicals or mercury salts with other drugs, for which extravagant claims are made, but which have little therapeutic value in comparison with arsphenamine. These drugs, some inefficient and others dangerous, sold under such trade names as Monarson, Arrhenal, Arsenoven, Atoxyl, or Soamin and Arsacetin, have been condemned by the American Medical Association and the United States Public Health Service. Those which are not dangerous probably have not the therapeutic value of the standard preparations, arsphenamine and neoarsphenamine, the manufacture of which is under the inspection and license of the United States Public Health Service. Since both arsphenamine and neoarsphenamine in a safe form, properly tested, can be obtained throughout the country, there is no excuse for the use in the routine treatment of syphilis of any product not passed by the Council on Pharmacy of the American Medical Association.

4. MERCURY.

Administered either by inunction or injection, mercury has a slower action than arsphenamine, but for this reason its use is indicated in those conditions where the administration of arsphenamine might cause a Herxheimer reaction and might affect unfavorably acute involvement of the heart, nervous system, or sense organs. Mercury is carried in the blood as an albuminate and is eliminated very slowly, so that, if it is administered carelessly, it may accumulate and give rise to serious toxic manifestations. This danger varies with the different methods of administration, which must be considered separately.

A. Mercurial inunctions.—Mercury is better tolerated when administered as an inunction than it is in any other form, but the use of mercury by inunction is limited by the difficulty of obtaining the patient's cooperation in applying the inunctions properly. Only exceptional patients can be relied upon to rub themselves properly, and as the process is dirty and disagreeable, the physician must have a considerable influence upon his patient to insure proper application.

Mercurial inunctions should be administered in a larger dose than is commonly employed by physicians. From 4 to 8 grams of 33 per cent mercurial ointment should be rubbed in every day for 6 days, and followed by a day of rest, during which a bath should be taken. From 40 to 80 inunctions should constitute a course, and a total of about 300 inunctions should be administered during the entire treatment. Several sites on the body, free from hair, should be chosen so that the mercury is not applied to the same area repeatedly. The areas best suited for inunctions are the sides of the back and abdomen and the inner sides of the thighs. Patients should be instructed to rub the ointment in for at least 15 minutes while in a warm room, but cautioned not to rub too vigorously. If the limit of toleration has been reached, further absorption may be prevented by giving two hot baths and a sweat.

B. Mercurial injections.—Either the soluble or the insoluble salts may be used in injections of mercury. The soluble salts are used and recommended by many eminent syphilologists; but in practice, the majority of physicians [3] are using the insoluble form probably because its use requires only one visit each week to the physician's office.

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[3] The replies to questionnaires addressed to the physicians of New Jersey show that 60 per cent of those replying use injections of salicylate.

Soluble and insoluble mercury salts compared.—The soluble preparations are preferable because their action is more rapid and is more easily controlled, and because they do not cause abscesses or embolism. The advantage of the insoluble salt, i. e., the infrequency of the visits required for its administration, should not outweigh the obvious advantages of the soluble form in so serious a disease as syphilis.

(*a*) Of the soluble salts—

(1) The bichloride is used most frequently.[4]

(2) The succinimide, the benzoate, the oxycyanide, and other salts are substituted by a few [4] physicians with the intention of causing less pain to the patient.

The soluble salts should be administered at least three times each week in 0.016 gram (¼ grain) doses. The intravenous injection of soluble salts is believed by Stokes to be dangerous; they should be injected intramusculary as are the insoluble forms.

(*b*) Of the insoluble salts—

(1) The salicylate in oil is the most satisfactory form and one most frequently administered.[4]

(2) Calomel is not absorbed quite so rapidly or regularly as the salicylate, but is used by few [4] physicians.

(3) "Gray oil" is substituted for the salicylate by only a very few physicians.[4] As it is absorbed irregularly and sometimes not for months, most syphilographers advise against its use.

The medium in which the insoluble mercury is suspended should consist of at least 9 parts of a vegetable oil to 1 part of mineral oil. The insoluble salts are usually administered once every 7 days, in 0.064 gram (1 to 1½ grain) doses. Irvine recommends a smaller dosage biweekly.

The effects of overdosage and how to prevent the toxic effects of mercury.—Since mercury is a poison only slightly less toxic to the human body than to the Treponemata, a dosage sufficiently large to be effective in the cure of syphilis may produce toxic effects in the body. The toxic effects are indicated most frequently by—

(1) Renal Complications: Stokes advises the making of a weekly urinalysis during the entire period of mercury administration and the inclusion of a microscopical examination for casts and blood. When kidney irritation is discovered, treatment with mercury should be suspended or reduced until the urine is free from the casts or cells. After this time the dosage should be increased cautiously.

(2) Salivation: Salivation should not be used as a guide for overdosage. The manifestations may be stopped by—

(*a*) The use of an alkaline tooth paste containing $KClO_3$ (potassium chlorate);

(*b*) Painting the gums with an astringent; and

(*c*) Gargling the throat.

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[4] All statements are based upon the replies to a questionnaire which was answered by one-third of the physicians of the State of New Jersey.

Slight discomfort felt when the teeth are clenched is not a danger signal and may be prevented by excluding acid fruits and vinegar from the diet.

(3) Gastrointestinal Complications: Gastrointestinal irritation may be controlled by—

(*a*) Regulating the diet to exclude foods with a high fiber content; and

(*b*) By prescribing bismuth, charcoal, or paregoric when indicated.

Method of injecting mercury.—The technique of intramuscular injection is described by Stokes as follows: The position of the patient has much to do with the ease of injection. The patient should lie face downward on the table, the arms hanging over the sides, the buttocks exposed, the legs extended with the toes turned in and heels out. This position relaxes the gluteal muscles. The upper, outer quadrants of the buttocks should be selected as the sites for the injections. The site should be washed with soap and water and rubbed with 70 per cent alcohol. The Luer syringe should be equipped with needles varying in length from 1 inch to 2½ inches, and preferably 22 gauge. It is important that the length of the needle be suitable to the type of buttocks presented by the patient, that it be of small diameter, and that it be sharp. With proper equipment and skillful technique, the pain of injection may be greatly diminished; but with needles too large and dull, the patient learns to dread the injection.

Stokes advises against the use of an empty needle. The syringe is filled with the mercury salt, the buttock is pulled down with the left hand and held firmly, and the needle is introduced quickly at an angle of 45°. If the needle is of the proper length, the point will lodge in the facia of the muscle rather than in the muscular tissue. If this is accomplished, the mercury salt spreads over the facia, is absorbed more easily, and does not produce nodules. After the needle is introduced, the syringe is aspirated lightly and a minute is allowed to give the blood an opportunity to appear in the syringe in case a vein is punctured. If blood does not appear, the mercury salt may be injected, but the injection should be given slowly. If blood *does appear*, the needle should be removed, the syringe refilled, and a new puncture made. It is not wise to attempt to jab the needle about hoping thereby to escape the vein which was punctured. When the injection is completed and the needle withdrawn, the release of the buttock prevents the escape of the salt.

5. THE IODIDES.

While the potassium salt is most commonly employed, the iodide of sodium is less depressing but no less efficacious. The iodides are believed to have some resolving action upon gummata and other overgrowths of connective tissue; the hypothesis is that the iodine neutralizes the agents which prevent the absorption of the diseased tissues. It may be necessary to omit the use of iodides in cases of tuberculosis.

While overdosage should be avoided, from 3 to 10 grams (approximately 50 to 150 grains) may be administered daily, if given after meals, with large quantities of water. On account of the occasional production of edema of the glottis, the initial dosage in 24 hours should not exceed 1 gram (15 grains).

Although the value of the iodides in the early stages of syphilis was not argued at the Institute at Washington, there are many references in the present-day literature urging their use in conjunction with the spirillicides in all stages of the disease, and therefore the iodides are included in the schedules of treatment which follow.

THE TREATMENT OF SYPHILIS IN THE EARLY PRIMARY STAGE.

If antisyphilitic treatment can be commenced soon after the appearance of the chancre and *before* the blood Wassermann becomes positive, it is possible, frequently, by the intensive administration of both arsphenamine and mercury in the maximum doses which can be administered without injuring the patient, to effect a cure in one year; but all cases must be followed up for at least two more years to watch for possible recurrences.

A study of the replies to a questionnaire on the treatment of syphilis shows that the majority of the physicians of New Jersey, who are administering arsphenamine and mercury in the treatment of early primary syphilis, are giving two or three courses, each consisting of from 4 to 8 injections of arsphenamine or neoarsphenamine and from 12 to 24 injections of a soluble salt. Few of the physicians answering the questionnaire rely on the injections of only a few large doses of arsphenamine to effect an abortive cure.

The minimum amount of drugs for the treatment of early primary syphilis recommended by the Bureau of Venereal Disease Control of the State of New Jersey is indicated in the following table:

Drug.	Injections.	Total grams.
Arsphenamine	16	7-10
or		
Neoarsphenamine	16	10-15
Mercury (soluble)	147	2.4 (37 grains)
or		
Mercury (insoluble)	49	3.0 (49 grains)

At times it may be necessary to discontinue the administration of one or another drug and to break in with additional rest periods because of the patient's condition or intercurrent illness. Therefore, while no hard and fast schedule can be prepared to be followed blindly, a typical schedule of the necessary minimum of treatment is presented in Table I for convenient reference in the treatment of cases presenting no unusual feature.

TABLE I.—*Primary syphilis: Blood Wassermann negative—Typical course of treatment for average sized adult male.*

Course.	Period during which indicated treatment is administered.	Weekly dosage of arsenic.	Weekly dosage of mercury.	Weekly dosage of iodides.	Tests.
First course.	First week.	3 injections of arsphenamine, dosage, 0.2 to 0.6 gm. as indicated; or 3 injections of neoarsphenamine, dosage, 0.3 to 0.9 gm. as indicated. First dose, one-third regular dosage; second dose, two-thirds (approximate).	Omit.	Omit.	Dark-field examination of lesion. Positive finding before beginning treatment.
	Second to sixth week (inclusive).	1 injection of arsphenamine, dosage, 0.4 to 0.6 gm.; or 1 injection of neoarsphenamine, dosage, 0.6 to 0.9 gm.	Beginning after fourth injection of the arsenical: 6 inunctions, 4 to 8 gm., or 1 insoluble salt, 0.064 gm. (1 gr.), or 3 soluble salt, 0.16 gm. ($\frac{1}{4}$ gr.) (1.6 c. c. of a 1 per cent solution).	Sodium or potassium iodide by mouth, 1 gm. or more daily (increasing in rare cases even as high as 10 gm.), given intermittently over 2-week periods with two weeks' rest.	Microscopical examination for erythrocytes and for casts.[1]
	Seventh to eighteenth week.	Omit.	Same as above.	Same as above.	Same as above.
	Nineteenth to twenty-second week.	Omit.	Omit.	Omit.	At end of month blood Wassermann can be taken, but treatment must be continued if negative.
Second course.	Twenty-third to thirtieth week.	1 injection of arsphenamine, dosage, 0.4 to 0.6 gm. as indicated; or 1 injection of neoarsphenamine, dosage, 0.6 to 0.9 gm. as indicated.	6 inunctions, 4 to 8 gm., or or 1 insoluble salt, 0.064 gm. (1 gr.), or 3 soluble salt, 0.016 gm. ($\frac{1}{4}$ gr.), (1.6 c. c. of a 1 per cent solution).	Sodium or potassium iodide by mouth, 1 gm. or more daily (increasing in rare cases even as high as 10 gm.), given intermittently over 2-week periods with two weeks' rest.	Microscopical examination of urine for erythrocytes and for casts.[1]
	Thirty-first to forty-eighth week.	Omit.	Same as above.	Same as above.	Same as above.
	Forty-ninth to fifty-second week.	Omit.	Omit.	Omit.	Blood Wassermann after 1 month without treatment. If negative, repeat at 1-2-3-4-5-6 month intervals.

[1] If the urine is not watched carefully, mercury should not be administered during the entire course of arsphenamine. Therefore, if for economic reasons the physician can not require a weekly urinalysis, mercurial treatment should be delayed until half the arsphenamine course has been given.

NOTE.—If blood Wassermann becomes positive, treat as latent syphilis.

THE TREATMENT OF SYPHILIS IN THE LATE PRIMARY AND SECONDARY STAGES.

After syphilis has progressed to the stage in which the blood Wassermann is positive (as it is before the secondary rash appears) the disease does not respond so well to intensive treatment, and it may be better sometimes to withhold such intensive treatment until the body has been prepared for it with preliminary injections of mercury. If no symptoms, such as headache or neurological signs, develop, the intensive treatment with arsphenamine should be begun on the eighth day with half dose, after treatment with iodides and injections of mercury (as indicated in the next table), followed with full doses of arsphenamine and mercury.

The typical schedule of treatment for late primary and secondary syphilis presented in Table II is prepared only as a convenient reference for uncomplicated cases. As in the treatment of early primary syphilis, no hard and fast schedule is possible. It is well to note that in the latter stages of syphilis the urinary examination is of increased importance, for frequently such cases do not tolerate mercury so well as do patients in whom treatment is begun earlier.

TABLE II.—*Late primary or secondary syphilis: Blood Wassermann positive—Typical courses of treatment for average-sized adult male.*

Course.	Period during which indicated treatment is administered.	Weekly dosage of arsenic.	Weekly dosage of mercury.	Weekly dosage of iodides.	Tests.
First course.	First week.	Omit.	6 inunctions, 4 to 8 gm.; or 1 insoluble salt, 0.064 gm. (1 gr.); or 3 soluble salt, 0.016 gm. (¼ gr.).	Omit.	Microscopical examination of urine, for erythrocytes and for casts.
	Second week.	2 injections of arsphenamine, dosage, 0.4 to 0.6 as indicated; or 2 injections of neoarsphenamine, dosage, 0.6 to 0.9 gm. as indicated (first dose half regular dosage).	Omit.	Omit.	Same as above.[1]
	Third to eighth week, inclusive.	1 injection of arsphenamine, dosage, 0.4 to 0.6 gm. as indicated; or 1 injection of neoarsphenamine, dosage, 0.6 to 0.9 gm. as indicated.	6 inunctions, 4 to 8 gm.; or 1 insoluble salt, 0.064 gm. (1 gr.); or 3 soluble salt, 0.016 gm. (¼ gr.).	Sodium or potassium iodide by mouth, 1 gm. or more daily (increasing in rare cases even as high as 10 gm.), given intermittently over two-week periods with two weeks' rest.	Same as above.[1]
	Ninth to twenty-sixth week.	Omit.	Same as above.	Same as above.	Same as above.
	Twenty-seventh to thirtieth week.	Omit.	Omit.	Omit.	Blood Wassermann can be taken, but treatment must be continued even if negative.

Second course.	Thirty-first to thirty-eighth week.	1 injection of arsphenamine, dosage, 0.1 to 0.6 gm. as indicated; or 1 injection of neoarsphenamine, dosage, 0.6 to 0.9 gm. as indicated.	6 inunctions, 4 to 8 gm.; or 1 insoluble salt, 0.064 gm. (1 gr.); or 3 soluble salt, 0.016 gm. (¼ gr.).	Sodium or potassium iodide by mouth, 1 gm. or more daily (increasing in rare cases even as high as 10 gm.), given intermittently over two-week periods with two weeks' rest.	Microscopical examination of urine, for erythrocytes and for casts.[1]
	Thirty-ninth to sixty-second week.	Omit.	Same as above.	Same as above.	Same as above. Blood Wassermann after two months without treatment; if negative, give one more course; if positive, at least two courses.
Third course.		Repeat second course.	Repeat second course, increasing the length of rest period.		
Fourth course.		Repeat second course.	Same as above in case of positive Wassermann at end of second course; if negative, omit but continue tests.		

[1] If the urine is not watched carefully, mercury should not be administered during the entire course of arsphenamine. Therefore, if for economic reasons the physician can not require a weekly urinalysis, mercurial treatment should be delayed until half the arsphenamine course has been given.

NOTE.—If blood Wassermann remains positive, treat as latent syphilis; if negative, repeat test at suggested intervals. If the Wassermann becomes positive later, treat as latent syphilis.

THE TREATMENT OF LATENT OR TERTIARY SYPHILIS.

The treatment of syphilis in the latent and tertiary stages is more a private medical problem than a public health problem, for only in the early stages is the disease highly infectious. While infectiousness is demonstrable in latent, tertiary, or "para-syphilis," it must be disregarded because of the economic limitations of the present-day program for the control of the disease. If all cases of syphilis in the earlier or florid stages could be treated adequately, the problem of control could be solved; and this properly may be the aim of our efforts. On the other hand, the discussion of the many details of the treatment of such affections as nervous, vascular, or heriditary syphilis can not be covered adequately in a short series of notes.

HYPOCHLORITE PROCESS OF OYSTER PURIFICATION.

REPORT ON EXPERIMENTAL PURIFICATION OF POLLUTED OYSTERS, ON A COMMERCIAL SCALE, BY FLOATING THEM IN SEA WATER TREATED WITH HYPOCHLORITE OF CALCIUM.

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Introduction.

Raritan Bay is one of the important oyster-producing areas of the country, and, owing to its proximity to New York City and contiguous urban centers, it became, with the growth of those communities, increasingly more desirable from a commercial standpoint and less desirable from the public health standpoint.

Recently, as shown by the *B. coli* content, the sewage pollution present in the waters and shellfish of the Raritan Bay area was reported generally to have reached the permissible limit from the public health standpoint, and in considerable areas it had exceeded such limits. The problem of what to do with the bay as a shellfish-producing area was becoming increasingly urgent, as it was not believed practicable to cause the abandonment of the area for shellfish culture.

To the already urgent problem was added the belief that the completion of the Passaic Valley sewerage project, adding about 300 million gallons of sewage per day to the waters of New York Bay, would make imperative the adoption of further safeguards to protect public health from the possibility of contracting infectious disease through the marketing of shellfish from this area.

The Passaic Valley sewerage project is a collecting trunk sewer serving several large congested urban populations in the Passaic River Valley, discharging through multiple dispersion outlets into the waters of Upper New York Bay along the westerly edge of the ship